BULLETIN

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Studies in the Botany of the southeastern United States.—VI.

By John K. Small.

RIBES CURVATA n. sp.

Perennial, glabrate, bright green, armed with subulate spines, which are about 4–6 mm. long. Stem diffusely branched throughout, 6–8 dm. long, clothed with a loose papery exfoliating bark; branches purplish; branchlets reddish, wiry, like the branches recurved, or conspicuously drooping; leaves suborbicular, 1–2 cm. in diameter, three-lobed, the lobes toothed, the terminal lobe often mucronate; petioles slender, as long as or shorter than the blade of the leaf, usually somewhat villous; flowers small but conspicuous, solitary; peduncles 7–8 mm. long; pedicels twisted, nearly as long as the peduncles, subtended by two 3-lobed ciliate bractlets; calyx-tube papillose; calyx-segments linear or linear-spatulate, 6 mm. long, whitish, reflexed and recurved, strongly nerved toward the middle, the edges hyaline, obtuse, one usually notched at the apex; petals oblong, 1.5 mm. long, white, obtuse, with lateral teeth and one or two nerves; stamens conspicuous, 7 mm. long, erect; filaments villous; anthers red; style somewhat shorter than the filaments, villous; berry globose, 6–8 mm. in diameter, crowned by the persistent stamens.

A low, diffuse shrub, growing on the slopes of Stone Mountain, Georgia; found in flower during the first two weeks of May, and in fruit in the first week of July, 1895.

CUPHEA PROCUMBENS Cav. Ic. 4: 55. *pl. 380.* 1797.

Mr. A. M. Huger has sent me specimens of this showy *Cuphea* from naturalized plants found at Horse Cove, Macon county, North Carolina, altitude about 800 meters. The plant has escaped from gardens.

PERILLA FRUTESCENS (L.) Britton, Mem. Torr. Club, 5: 277. 1894.

This garden plant is establishing itself along the roadsides in the foothills of the mountains of Georgia, notably between Toccoa Falls and Tallulah Falls.

THE NORTH AMERICAN SPECIES OF ILYSANTHES.

Field experience with *Ilysanthes* convinces me that the genus has never been correctly understood. The botanists of the early part of this century seem to have limited the species much better than later authors. Among the later botanists Dr. Chapman* has given us the most satisfactory interpretation of the genus, but he makes *I. gratioloides* a composite. Dr. Gray's treatment in the Synoptical Flora† is inferior in that it contains the composite species just mentioned, and reduces *I. saxicola*, a clearly distinct species, to a variety or state of *I. refracta*. The following seems to me to be the proper division of the genus:

Key to the Species.

Stems creeping, leafy throughout; leaves orbicular or orbicular-ovate, all sessile, rounded at the base.

Leaves entire; upper lip of the corolla much shorter than the lower; capsule slender, much shorter than the calyx. 1. *I. grandiflora.*

Leaves 3-toothed; upper lip of the corolla about equalling the lower; capsule stout, equalling or slightly exceeding the calyx. 2. *I. tridentata.*

Stems erect or ascending, not creeping; leaves more or less elongated, the lower ones usually narrowed at the base.

Pedicels shorter than the leaves; calyx-segments commonly as long as or longer than the capsule. 3. *I. attenuata.*

Pedicels longer than the leaves; calyx-segments shorter than the capsule.

Leaves slightly reduced above; pedicels ascending or spreading.

Upper leaves more or less clasping; capsules much longer than the calyx-segments. 4. *I. gratioloides.*

Upper leaves not at all clasping; capsules slightly longer than the calyx-segments. 5. *I. saxicola.*

Leaves reduced to narrow inconspicuous bracts above; pedicels reflexed. 6. *I. reflexa.*

1. ILYSANTHES GRANDIFLORA (Nutt.) Benth. in DC. Prodr. 10: 418. 1846.

Lindernia grandiflora Nutt. Gen. 2: 43. 1818.

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* Fl. S. States, 294.

† Syn. Fl. 2: Pt. 1, 283.

Annual, slender, glabrous, somewhat fleshy, bright green. Stems decumbent and creeping, leafy throughout, 2–20 cm. long, simple or rarely branched; leaves suborbicular, .5–1 cm. in diameter, leathery, entire, usually obtuse, sessile, rounded at the base, more or less clasping; pedicels filiform, 2–4 cm. long, several times longer than the leaves; calyx-segments linear-lanceolate, 3 mm. long, acute, about as long as the capsule; corolla blue, slender, about 1 cm. long, its upper lip much shorter than the lower; capsule slender, narrowly oblong, or narrowly ovoid, 4.5–5 mm. long, acute or acuminate, much longer than the calyx.

Low wet places, eastern Georgia and Florida, March to October. Ascends only a few meters above sea level.

2. ILYSANTHES TRIDENTATA n. sp.

Ilysanthes grandiflora S. Wats. Proc. Am. Acad. **22**: 442. 1896. Not Benth. 1846.

Annual or biennial, fleshy, slender, glabrous. Branches erect or ascending from a rhizome-like creeping stem, simple or sparingly branched, leafy throughout; leaves orbicular-ovate, 4–6 mm. long, with two low teeth below the apex, rounded at the base, sessile or sometimes slightly clasping, rather densely punctate; pedicels filiform, 1.5–2 cm. long, ascending; calyx minutely glandular-puberulent, its segments linear, 2.5–3 mm. long, obtuse, more than twice shorter than the corolla; corolla stout, 10–12 mm. long, its upper lip very slightly crisped, nearly as long as the cleft and slightly involute lower one; capsule oblong-obovoid, 3–3.5 mm. long, obtuse, equalling or slightly longer than the calyx; seeds oblong or obovoid, angled, with a minute tubercle at the summit.

Rio Blanco, Jalisco, Mexico (Palmer, 46). June to October.

3. ILYSANTHES ATTENUATA (Muhl.).

Lindernia attenuata Muhl. Cat. 59. 1813.

Lindernia pyxidaria var. *major* Pursh, Fl. Am. Sept. 419. 1814.

Gratiola attenuata Spreng. Syst. **1**: 39. 1825.

Ilysanthes gratioloides curtipedicellata Bush, Bull. Torr. Club, **21**: 494. 1894.

Annual, low, fleshy, glabrous, dull-green. Stem erect or ascending, 1–5 dm. long, the branches often numerous, spreading; leaves oblong or ovate, sometimes oblanceolate, or obovate, 1–3 cm. long, thinnish, obtuse, distantly and shallowly serrate, five-nerved, gradually narrowed into a short petiole, or the upper ones nearly sessile; pedicels rather stout, shorter than the leaves; calyx-segments linear-subulate, as long as or longer than the capsules;

corolla 4–11 mm. long; capsule narrowly ovoid, about 4 mm. long; pointed, tipped by the persistent style; seeds oblong, slightly curved, .3–.4 mm. long, yellowish-brown, transversely wrinkled, with usually rounded ends.

Wet places, Ontario to Wisconsin and Missouri, south to the Gulf of Mexico. March to October. Ascends to about 670 meters in the mountains of Virginia.

My attention was first called to this plant by Mr. Bush's Missouri specimens (described as *I. gratioloides curtipedicellata*) and by some I collected in North Carolina. On taking up the subject I found no lack of material, there being twenty-two specimens in the Herbarium of Columbia University variously associated with twenty-five specimens of *I. gratioloides*, some even over the same label. *I. attenuata* can be distinguished from *I. gratioloides* at sight by its stouter and lax habit and short pedicels, while a closer examination will show the calyx-segments of the former as long as or longer than the capsule, whereas those of the latter are always much shorter than the capsule.

4. Ilysanthes gratioloides (L.) Benth. in DC. Prodr. **10**: 419. 1846.

Capraria gratioloides L. Sp. Pl. Ed. 2, 876. 1763.

Gratiola anagallidea Michx. Fl. Bor. Am. **1**: 5. 1803.

Lindernia dilitata anagallidea Muhl. Cat. 59. 1813.

Lindernia pyxidaria Pursh, Fl. Am. Sept. 419. 1814.

Ilysanthes riparia Raf. Ann. Nat. 13. 1820.

Gratiola dilatata Muhl.; Spreng. Syst. **1**: 39. 1825.

Ilysanthes attenuata Raf.; Benth. in DC. Prodr. **10**: 419. 1846. Not *L. attenuata* Muhl.

Ilysanthes dilitata Raf.; Benth. in DC. Prodr. **10**: 419. 1846.

Annal, low, wiry, glabrous, bright green. Stem erect, or at length decumbent, 1–2 dm. long, simple or diffusely branched from near the base; leaves ovate, or the lower oblong or obovate, somewhat leathery, .6–2 cm. long, obtuse or acute, entire or nearly so, indistinctly nerved, sessile, abruptly narrowed at the base (except some of the lower ones), obtuse or subcordate; pedicels wiry, much longer than the leaves; calyx-segments linear, shorter than the capsule; corolla 5–7 mm. long; capsule ovoid, 4–5 mm. long, rather blunt, tipped by the persistent style; seeds oblong, .2 mm. long, nearly straight, reddish, transversely wrinkled, with usually square ends.

Damp places, New England to Dakota, Nebraska and Texas, south to the Gulf of Mexico, across the southern boundary of the United States and on the Pacific coast; also in Cuba, and said to occur in Mexico. July to September. Ascends to 100 meters both in the Eastern and Pacific States.

Ilysanthes gratioloides has a more extensive geographic distribution than any other of our species. It ranges over the whole United States, except a part of the Rocky Mountain region, although further exploration may show its existence there. It is said to be native in South America and eastern Asia and to be naturalized in western Europe. I have not seen foreign specimens.

5. ILYSANTHES SAXICOLA (M. A. Curtis) Chapm. Fl. S. States, 290. 1860.

? Lindernia monticola Muhl. Cat. 59. Without description. 1813.

Lindernia saxicola M. A. Curtis; Am. Journ. Sci. **44**: 83. 1843.

Ilysanthes refracta var. *saxicola* A. Gray, Syn. Fl. N. A. **2**: pt. 1, 283. 1878.

Annual or sometimes biennial, glabrous, slender, but somewhat fleshy, bright green. Stems solitary or tufted, erect or assurgent, 2–20 cm. long, simple, or sparingly branched, especially above; leaves fleshy-leathery, 0.5–1.5 cm. long, the basal tufted, spatulate, obtuse, commonly very short-petioled, the upper ones ovate, lanceolate or narrowly elliptic, acutish, sessile, not clasping, slightly narrower than the lower; pedicels wiry, but rather stout, ascending or spreading, 1–1.5 cm. long, 3–4 times longer than the leaves; calyx-segments linear-lanceolate, acutish or obtuse, 2 mm. long, slightly shorter than the capsule; corolla pale blue, variegated, about 1 cm. long, its segments crisped; capsule ovoid, 3 mm. long, rather obtuse; seeds globose-oblong, 0.5 mm. long, pale.

Crevices in damp rocks, Tallulah Falls, Georgia, and on the Hiwassee River, North Carolina. At about 460 meters at Tallulah Falls, and probably at a little greater altitude in North Carolina.

6. ILYSANTHES REFRACTA (Ell.) Benth. in DC. Prodr. **10**: 419. 1846.

Lindernia refracta Ell. Bot. S. C. and Ga. **1**: 579. 1817.

Lindernia monticola Nutt. Add. 1818.

Annual or biennial, glabrous, very slender and wiry, bright green. Stems several together or densely tufted, erect or ascend-

ing, .8–3 dm. long, at length almost filiform, nearly naked, simple or sparingly branched and finally diffuse; leaves mostly basal, spatulate or obovate, 1–3 cm. long, obtuse, entire or undulate, sessile or narrowed into a short petiole; stem leaves reduced to narrow inconspicuous bracts, except a pair at the first or second node; pedicels filiform, at length reflexed, 2–4 cm. long; calyx-segments almost linear, 2–3 mm. long, acutish, twice shorter than the capsule; corolla 1–1.3 cm. long, its segments flat; capsule linear-oblong, about 4 mm. long, acute or acutish; seeds globose-oblong, .5 mm. long, orange, with a small tubercle at the end.

Mostly on wet rocks, North Carolina to Mississippi, south to Florida. Spring to Fall. Ascends to about 365 meters on Little Stone Mountain, Georgia.

GAYLUSSACIA URSINA (M. A. Curtis) T. & G.; A. Gray, Mem. Am. Acad. (II.) 3: 49. 1846.

Flowering specimens of this rare huckleberry were collected by Mr. A. M. Huger, in the mountains about Highlands, Macon county, North Carolina, June, 1895. The altitude was about 710 meters.

SOLIDAGO PURSHII Porter, Bull. Torr. Club, 21: 311. 1894.

"* * * Two remarkable southern stations * * *," namely McCalls Ferry, Pennsylvania, and Great Falls of the Potomac, are mentioned in the Synoptical Flora as localities for this northern *Solidago*.

In the latter part of August, 1894, I was surprised to find handsome specimens growing in crevices of the rocks at the bottom of the cañon at the falls of the Yadkin river, and at the Narrows some miles above the falls in middle North Carolina. The plants differ from specimens from the northern localities in their greater size and glabrous achenes. There is an abundant growth during the last part of August and the first weeks in September, but at other seasons hardly a vestige of the species can be found. The average height of the plants is about three feet; a few specimens attained a height of four feet. At these localities the species is more plentiful and attains a greater development than it does at the northern stations.

SOLIDAGO GRACILLIMA T. & G. Fl. N. A. 2: 215. 1841.

In September, 1894, I found this species on the summit of Little Stone Mountain, Georgia. Heretofore it has been known only from middle Florida, from collections by Dr. Chapman.

SOLIDAGO RADULA Nutt. Journ. Acad. Phila. 7: 102. 1834.

Found for the first time east of the Alleghenies on August 18th, 1891, by Mr. Heller and myself growing on dry hillsides, just west of the Falls mountains, Stanley county, North Carolina, and observed for several succeeding years. This is an interesting addition to the eastern flora.

HELIANTHUS OCCIDENTALIS Riddell, Suppl. Cat. Ohio Pl. 13. 1836.

This prairie species occurs in a meadow near Logansville, Georgia, about twenty-five miles east of Atlanta. This seems to be the first record of its occurrence east of the Blue Ridge.

Notes on Potentilla.—III.

BY P. A. RYDBERG.

With the exception of two species, viz., the white-flowered *P. tridentata* Soland., and the introduced *P. nemoralis* Nestl., all the North American perennial species with ternate leaves can be divided into two natural groups, viz., the *Niveae*, with leaves densely white-tomentose beneath, and the *Frigidae*, without tomentum. Both groups consist of plants generally less than 2 dm. high and often more or less caespitose. The style is terminal or nearly so, filiform but short, in all, except *P. flabellifolia*, not longer than the mature achenes. All the species are arctic or alpine.

To the *Niveae* belong the following:

POTENTILLA VILLOSA Pall.; Pursh, Fl. Am. Sept. 353. 1814.

P. fragiformis villosa Regel & Tiling, Fl. Ajan. 85.

Watson follows Regel & Tiling in placing *P. villosa* as a variety under *P. fragiformis*. The two resemble each other in one important character, viz., the broadly oval obtuse bractlets, which, as well as the calyx, enlarge considerably in fruit. *P. villosa* differs from *P. fragiformis*, however, in the leaves as well as in the flowers; those of the former are much thicker, densely silky above (rarely glabrate), and densely floccose and with prominent veins beneath. The flowers are about one-half larger than those of *fragiformis*. From all the species of the group it differs in the large 2-3 cm. wide

flowers, stout habit, large leaves and broad bractlets. *P. villosa* is a native of Alaska and adjacent Asia, but is also found in the mountains of British Columbia, Vancouver Island and Washington.

POTENTILLA HOOKERIANA Lehm. Ind. Sem. Hort. Bot. Hamb. 1849: Add. 10. 1849.

Dr. Watson placed this with *P. Pennsylvanica* on account of the style. It is glandular, but scarcely thickened near the base, and not curved as in *P. Pennsylvanica*. In habit it comes nearest to *P. nivea*; and as the style is often glandular in *P. villosa* and sometimes in *P. nivea*, it is better to include *P. Hookeriana* in this group, with which it agrees in all other respects. It differs from *P. nivea* in the more deeply dissected leaves, the smaller flowers, the bractlets, which equal the sepals, and a slightly stricter habit. It is a very rare plant.

POTENTILLA NIVEA L. Sp. Pl. 499. 1753.

The common form of this species is fully as tall as either of the two preceding, but very slender. The flowers are only 15 mm. in diameter, the bractlets linear-oblong or lanceolate, shorter than the ovate-lanceolate sepals. The obcordate petals only a little exceed the sepals. The leaflets are 1-3 cm. long, oblong or obovate, with broad teeth. *P. nivea* is distributed throughout the arctic regions and in the higher mountains of the northern hemisphere. In America it ranges from Labrador to Alaska, extending in the Rockies as far south as Colorado.

P. nivea is very variable. The following varieties have been collected in America:

POTENTILLA NIVEA MACROPHYLLA Hook. Bot. Mag. 57: *pl. 2982.*

Leaflets very large and deeply incised; plant taller than the ordinary form.

POTENTILLA NIVEA QUINQUEFOLIA.

P. nivea pentaphylla Lehm. Nov. Stirp. Pug. 9: 69. 1851. Not *P. pentaphylla* Richt.

P. nivea dissecta Wats. Proc. Am. Acad. 8: 559. 1873. Not *P. dissecta* Pursh, 1814.

Leaves quinate as well as ternate; leaflets deeply toothed, in the quinate leaves the lower ones often smaller.

POTENTILLA NIVEA UNIFLORA (Ledeb.).

Potentilla uniflora Ledeb. Mem. Acad. St. Petersb. 5: 543.

P. nivea Vahliana American authors, at least in part.

The true position of this plant is difficult to determine. It may be placed as a variety of *P. nivea* or of *P. Vahliana* or as a species intermediate between the two. Ledebour made it a variety of *P. villosa*, which it somewhat resembles as to the leaves. It has the caespitose habit, short nearly leafless stems, and short wedge-shaped leaves of *P. Vahliana*. Its flowers are nearly of the same size as those of that species, but the petals are obcordate, not reniform, and the sepals and bracts are those or *P. nivea*, depauperate forms of which grade into it. It is found in the arctic regions from Greenland to Alaska and adjacent Asia, but also in the Rocky Mountains of Colorado. Apparently all specimens labelled *P. nivea Vahliana* from the Rockies belong to *P. nivea uniflora*. It was evidently this form that Watson had in mind when he made the statement that *P. Vahliana* was a depauperate few-flowered form of *P. nivea*.

POTENTILLA VAHLIANA Lehm. Monog. 172. 1820.

P. hirsuta Vahl; Hornem. Fl. Dan. *pl. 1390*. Not Michx.

This is very low and matted, the large flowers a little exceeding the leaves. The petals are very broadly subreniform, *i. e.*, broader than long, and therefore overlap each other; the bractlets are broadly oval, obtuse and about equal the ovate sepals. The whole plant is covered with yellowish villous hairs besides the tomentum. Lehmann was in some doubt whether he should regard it as a variety of *P. nivea* or as a distinct species. He made it a species on the authority of Vahl, who knew the plant in its native haunts. Seeing only *P. nivea* and *P. Vahliana* nobody would hesitate in assigning specific rank to the latter. The trouble comes in when one is to draw the line between either and *P. uniflora*. Lehmann states that *P. Vahliana* was collected by Richardson in

Captain Franklin's journey. Specimens collected by Richardson and named *P. Vahliana* are in the Torrey Herbarium at Columbia, but these, it seems to me, rather belong to *P. uniflora*. There is, however, from the same collector one specimen, a very small one, indeed, which without any doubt belongs to *P. Vahliana*, but this is together with two specimens of *P. nana* under the name *P. nivea arctica*. Except this specimen and one from Herald Island, all specimens seen are from Greenland and the islands of Baffin Bay. They are generally labelled *P. pulchella*. The latter species is easily distinguished by its small flowers, the petals scarcely exceeding the sepals, and its deeply dissected leaves which are pinnate with two approximate pairs of leaflets.

The *Frigidae* differ from the *Niveae* principally in the lack of tomentum. They are all low, more or less caespitose, arctic or alpine plants. To this group belong the following:

POTENTILLA ROBBINSIANA Oakes; Torr. & Gray, Fl. N. Am. 1: 441. 1838, as a synonym under

P. minima Robbinsiana Torr. & Gray, *l. c.*

P. frigida American authors, not Vill.

Torrey and Gray placed this species as a variety under *P. minima* and Watson tranferred it to *P. frigida*. It very much resembles both of those European species. It comes nearest to *P. minima* in habit, but to *P. frigida* in pubescence. It differs from both in the small petals, which about equal the sepals, and in the bracts and the sepals, which are very narrow and subequal. In both *P. frigida* and *P. minima* the petals are longer than the sepals, and these much longer than the bractlets. The same characters that distinguish *P. Robbinsiana* from the two species mentioned distinguish it also from its American relatives. The range of *P. Robbinsiana* is very limited. It apparently is confined to the White Mountains of New Hampshire.

POTENTILLA ELEGANS Schlecht. & Cham. Linnæa, 2: 22. 1827.

This species, as far as I know, has not yet been collected in America, but is mentioned here because it is quite common across Behring Strait and may be found in Alaska. It resembles *P. Robbinsiana* in the sepals and bracts, but is a more delicate plant, the leaflets being only 3–5 mm. long and nearly glabrous.

POTENTILLA EMARGINATA Pursh, Fl. Am. Sept. 1: 353. 1814.

This species was described from specimens collected by Kohlmeister in Labrador. According to Lehmann (Hook. Fl. Bor. Am. 1: 194), *P. nana*, also, was collected by the same missionary. There is therefore a doubt which of the two is the original *P. emarginata*. The latter, as understood by Vahl, Lehmann and others, is a stouter plant than *P. nana*, has very narrow bracts, and leaves with acute teeth, of which the terminal is generally the largest. In both the flowering stems scarcely exceed the leaves. *P. emarginata* grows in Labrador, the Baffin Bay region, Greenland and Spitzbergen.

POTENTILLA NANA Willd. Mag. Gesell. Naturf. Fr. Berl. 7: 296. 1813.

Dr. Watson states that this is a depauperate form of *P. emarginata*. As understood by Lehmann, it is a plant much nearer related to *P. fragiformis*. The habit is caespitose, as in *P. emarginata*, but the teeth of the leaves are rounded and the terminal one generally smaller, and the bractlets are broadly elliptical and enlarge in fruit, as in *P. fragiformis*, from which it differs mainly in size, being in every respect smaller, and in the fact that the flowering stems scarcely exceed the leaves. A connecting link is formed by the Greenland *P. Friesiana*, which resembles *P. nana* in every respect, except that the flowering stems are elongated, as in *P. fragiformis*. Probably all three are but forms of one species. *P. nivea arctica*, at least as to Richardson's plant, must be included in *P. nana*. It ranges through arctic America from Labrador to Alaska, and is also found in eastern Siberia.

POTENTILLA FRAGIFORMIS Willd. Mag. Gesell. Naturf. Fr. Berl. 7: 294. 1813.

Differs from *P. nana* in being in every respect more robust and with stems 1–2 dm. high. It somewhat approaches *P. villosa* in habit, but lacks the tomentum and has much smaller flowers. It comes nearest the Caucasian and Siberian *P. gelida* Meyer, but differs in its hirsute pubescence. *P. fragiformis* is mainly Siberian, but has been collected on the Aleutian Islands.

POTENTILLA FLABELLIFOLIA Hook.; Torr. and Gray. Fl. N. Am. 1: 442. 1838.

P. gelida American authors, not Meyer.

This is near *P. gelida* and has generally been included therein, but differs in its much larger flowers, lighter foliage and a thicker creeping rootstock; it is best to regard it as at least a good variety. If the isolated range is taken in consideration, it is still better to regard it as a species. *P. flabellifolia* is found on the higher mountains of Oregon and Washington, while *P. gelida* grows in the Caucasus and eastern Siberia.

Near *Frigidae* is another group, which may be called *Brevifoliae*, consisting of only two species. It differs from the preceding group mainly in two characters, viz.: pinnately 3–5-foliolate leaves and a very long and slender style, which is fastened a short distance below the apex of the achene. Both species are low, less than 1½ dm. high, from a thickish branched rootstock.

POTENTILLA GRAYI Wats. Proc. Am. Acad. 8: 560. 1873.

In this species the leaflets are only three, broadly obovate or nearly obicular. The habit of the plant reminds one somewhat of *P. flabellifolia*, but the middle leaflet is considerably stalked, showing that the leaf is pinnate with only one pair, rather than ternate. As the style is of the same form and the same place of attachment as in *P. brevifolia*, it is better to let the two constitute a group by themselves, especially as the habit and flower is nearly the same. *P. Grayi* has been collected only in the mountains around the Yosemite valley, California.

POTENTILLA BREVIFOLIA Nutt.; Torr & Gray, Fl. N. Am. 1: 442.

This species has leaves with about two pairs of rounded 2–3-cleft and crenate leaflets, which are rather small, only ½–1 cm. long. Lehmann included it in the *Glandulosae* on account of the habit, which a little resembles that of the group mentioned, and the fact that the plant is somewhat glandular puberulent. As stated before, the style is very slender, filiform, not basal, but fastened near the apex; the anthers are not flat, and plainly divided into two lobes, and the petals are emarginate. It is confined to the alpine peaks of Oregon.

Contribution to the Myxogasters of Maine.

By F. L. Harvey.

The following list includes all the species of slime-moulds known by the writer to have been collected in Maine.

Species recorded by Saccardo, Massee and Lister are noted. We have had accesses to Sprague's lists; the collections in the Port. S. N. H. determined by Cooke and Berkeley, a list of Maine fungi collected by Rev. J. Blake, specimens in the Blake Herbarium of the Maine State College; and a list of specimens collected at Rangely and Bar Harbor by Dr. Rex. The specimens collected by the writer have all been examined by either Wingate, Peck, Ellis, Rex or Morgan, or carefully compared with authentic specimens. We will be glad to know of additional references or the names of past or present Maine collectors of these forms. The list is by no means exhaustive, as each year brings to light new and interesting forms. Dr. Rex said "your second sending contains an unusual number of interesting forms and suggests that there may yet be many treasures found."

We are under great obligations to the above named specialists, especially to Mr. Wingate, from whom came the original inspiration to study and collect these forms, and to Dr. Rex for many kind letters and the determinations of specimens, and since his death to Mr. Morgan for similar favors. We have followed the order of genera given in Lister's recent monograph.

MYXOMYCETES OF MAINE.

Ord. Ceratiomyxaceae.

1. *Ceratiomyxa mucida* Schroet.=*Ceratium hydnoides* Alb. & Schw. Common on rotton wood. Orono; Greenfield (Harvey).

Ord. Physaraceae.

2. *Badhamia hyalina* (Pers.) Berk. In Blake Herb. as *Physarum hyalinum* Pers. Cumberland (Blake).

3. *B. utricularis* (Bull.) Berk. Low ground on prostrate logs. Orono, Oct. (Harvey).

4. *B. macrocarpa* (Ces.) Rost. Common in low ground on logs. Orono, Oct. (Harvey).

5. *B. fasciculata* (Jungh.) Rost. On bark of dead gray birch on ground in a swamp. Orono (Harvey).

6. *Physarum Petersi Farlowii* Rost. (*P. globuliferum* Pers. according to Lister.) Under bark of a standing birch. Orono (Harvey).

7. *P. virde* Pers. Under this head we put *Tilmadoche viridis* and *T. mutabilis*, both from Rangely (Rex).

8. *P. didermoides*. Port. S. N. H. Coll. no. 55 as *Didymium congestum* B. & Br. (Fuller).

9. *P. cinereum* (Batsch) Pers. Rangely (Rex).

10. *P. contextum* Pers. Rangely (Rex). Orono (Harvey).

11. *P. sinuosum* (Bull.) Rost. Rangely (Rex). *P. bivalve* of Lister.

12. *P. penetrale* Rex. Rangely (Rex).

13. *P. leucophaeum* Fr. Rangely (Rex). Orono (Harvey). 1889. Lister makes this *P. nutans* var. *leucophaeum*. Rex says "specimens well marked with a large central vesicular granule of lime.

14. *P. nutans* Pers. Herb. Port. Soc'y, no. 32 (Fuller). Harrison (Blake). Rangely (Rex). Orono (Harvey). Our specimens are *Tilmadoche nutans* Rost.=*P. nutans* var. *genuinum* List.

15. *P. Ditmari* Rost. Rangely (Rex).=*P. virescens* Ditm.

16. *P. citrinellum* Pk. Greenfield, Oct., 1895 (Harvey).=*Craterium citrinellum* Lister.

17. *Fuligo septica* Gmelin. Rangely (Rex). Orono & Greenfield (Harvey). Specimens collected at Greenfield, September, 1895, were infested by the rare fungus *Hypomyces violaceus* (Fr.) Tul. The aethalia vary in color and size. The shades are brown, yellow and white. Some aethalia are nearly 3 in. across. We have found specimens 3 ft. from the ground on the side of living trees.

18. *Craterium leucocephalum* Ditm. Rangely (Rex). *Craterium citrinellum* Lister is recorded as *Physarum citrinellum* Pk. See this list No. 16.

19. *Leocarpus fragilis* (Dicks.) Rost. Herb. P. S. N. H. no. 21, as *Diderma vernicosum* Pers. (Fuller). Rangely (Rex). Orono, September to November (Harvey) = *L. vernicosus* Link, of Lister.

20. *Condrioderma testaceum* (Schr.) Rost. Rangely (Rex).

21. *C. Michelii* Rost. Rangely (Rex). These specimens were the sessile variety.

22. *C. aculeatum* Rex.=*C. Sauteri* Rost. Bar Harbor (Rex).

23. *Diachaea elegans* Fries. Herb. P. S. N. H. (Fuller). Rangely (Rex).

24. *D Thomasii* Rex. This is spoken of by Lister as having been collected by Prof. Thaxter at "*Killery*," U. S. A. Probably Kittery, Me., is meant.

ORD. DIDYMIACEAE.

25. *Didymium Clavus* Rost. Rangely (Rex).

26. *D. farinaceum* Schrad. Rangely (Rex). Orono (Harvey).

27. *D. microcarpon* Fr. Herb. P. S. N. H. as *D. nigripes* Fr. (Fuller). Cumberland (Blake). Bar Harbor and Rangely (Rex).

28. *D. Xanthopus* Fr. Wells (Blake).

29. *D. proximum* B. & C. Beech woods, Orono (Harvey).

30. *D. eximum* Pk. Orono (Harvey). The four preceding species are united by Lister as *D. nigripes* Fries, and varieties.

31. *D. effusum* Link. Rangely (Rex).

ORD. STEMONITACEAE.

32. *Stemonitis fusca* Roth. Otisfield (Blake). Rangely (Rex). Orono and Oldtown (Harvey).

33. *S. herbatica* Pk. On fallen trunks. Greenfield, Oct. (Harvey).

34. *S. ferruginea* Ehrenb. Rangely (Rex). Orono, Aug. (Harvey).

35. *S. Smithii* Macbride=*S. microspora* List. Greenfield, Sept 1895 (Harvey).

36. *Comatricha typhoides* Rost. Port. S. N. H. Coll., no. 94 (Fuller). Rangely (Rex). Orono (Harvey).

37. *C. obtusata* Preuss. Sprague's N. Eng. Myc., p. 318 (Morse), as *Stemonitis ovata* Pers. Bar Harbor (Rex). A single very fine cluster was found at Orono by my son, Bartle Harvey, upon a decaying spruce timber from a barn.

38. *C. longa irregularis* Lister. Our specimens were named by Rex as *C. irregularis* Rex. Greenfield, Oct. Other specimens collected at Oldtown, September, 1895, were submitted to Morgan, who named them *C. crypta* Schw.

39. *Lamproderma physarioides* Rost. Rangely (Rex). Greenfield, September, 1895 (Harvey).

40. *L. columbinum* (Pers.) Rost. Greenfield, October, 1894. On moss covering a log, in fine development (Harvey).

Regarding this form Mr. Morgan made the following note: "It corresponds exactly to what Rostafinski describes as *Lamproderma columbinum* (Pers.) Rost. Lister and Massee have made very bad work of this genus, so that the students in this country using their volumes can scarcely tell what to do with their specimens. I was influenced by Lister in this genus, but after the publication of his volume I am disposed to fall back on Rostafinski. Lister combines this species with *L. physaroides* A. and S. This I think is not correct. The old writers describe them as distinct, one with a silvery sheen and the other with a steel blue luster. Both have long stipes. I think Rostafinski is correct in allowing them to stand as two good and distinct species. It is more like *L. violaceum* Fr., having, however, a much larger stipe."

41. *L. violaceum* Rost. Greenfield, 1895 (Harvey).

42. *L. arcyrioides* (Somm.) Rost. Rangely (Rex). Lister puts this under *L. violaceum* Rost.

ORD. AMAUROCHAETACEAE.

43. *Amaurochaete atra* Rost. Herb. P. N. S. H. as *Reticularia atra* Fr. Maine (Fuller).

ORD. HETERODERMACEAE.

44. *Lindbladia tubulina* Fries. Cumberland (Blake) as *Licea spermoides* B. & C.

45. *Cribraria intricata* Schrad. Rangely (Rex).

46. *C. tenella* Schrad. Bar Harbor (Rex).

47. *C. purpurea* Schrad. On decaying logs, Greenfield, Oct. (Harvey).

48. *Dictydium umbilicatum* Schrad. Rangely (Rex) as *D. cernuum* Pers.

ORD. LICEACEA.

49. *Licea fragiformis* Fr. Cooke's Hand Book, 1: 408. Cumberland (Blake). This form is noted in Blake's list. It is not recorded by Saccardo or Lister, and we have not been able to trace the synonymy. It may be *Tubulina cylindrica* (Bull.) DC., as Saccardo records *L. fragiformis* Nees as a synonym of this species.

50. *L. minima* Fr. Sacc. 7: 405. Cumberland (Blake). The

specimens in the Blake Herb. bearing this name were mounted on a sheet without protection and are in bad shape. They were determined for Blake by Cooke and were probably correct. Saccardo questions whether this species belongs to the genus *Licea*, while Lister makes it a good species.

51. *Orcadella operculata* Wing. Proc. Phil. Acad. 1889: 280. Trunks of living red oaks, Me. (Wingate.)

ORD. TUBULINACEAE.

52. *Tubulina fragiformis* Pers. Very common on hemlock stumps and logs and other situations. Rangely (Rex). Orono, Greenfield, Oldtown, Jackman, Norcross, etc. (Harvey).

ORD. RETICULARIACEAE.

53. *Enteridium Rozeanum* Wing. On charred fallen trunks Chemo Pond, Bradley (Harvey).

ORD. TRICHIACEAE.

54. *Trichia fallax* Pers. As *T. clavata* Wig. in Port. N. H. Coll. no. 19, Fuller. Rangely (Rex.). Orono (Harvey).

55. *T. varia* Pers. Rangely (Rex.). Orono, 1889, Sept. Greenfield, Sept., 1895 (Harvey). Rex. says, "This is peculiar in the elongated sporangium, terminating in a hollow stipe, like *T. fallax*. I have never seen anything like it in *T. varia* before.

56. *T. varia sessilis* Rost. Cumberland (Blake). Orono (Harvey). Lister does not recognize this variety.

57. *T. chrysosperma* (Bull.) DC.=*T. favoginea* Pers. Herb. Port. S. N. H. Coll. no. 18 (Fuller) Rangely (Rex.), Greenfield, Sept., 1895 (Harvey).

58. *T. Jackii* Rost.=*T. persimilis* Karst. Greenfield (Harvey). Rex says of my specimens that they are "strongly marked."

59. *T. scabra* Rost. Rangely (Rex). Orono and Oldtown, September, 1895 (Harvey).

60. *T. inconspicua* Rost. Rangely (Rex). Orono (Harvey). Lister regards this as *T. contorta* Rost.

61. *T. contorta* Rost. Orono (Harvey). Rex says my specimens are good examples of this species.

62. *T. reniformis* Pk. Orono (Harvey). Rex says, "This is typical according to a specimen of the type sent me by Prof. Peck."

Later, Rex says this seems really to be a form of *T. contorta*. Lister includes it in the above species.

63. *T. abrupta* Cooke, Grev. 5: 150. Cooke B. Myx. 256 (Portland). Lister refers this form to *T. persimilis* Karst.

64. *T. subfusca* Rex. Jackman (Harvey), Sept., 1895. Lister makes this var. *subfusca*, under *T. Botrytis*. Morgan says, "The stipe is much shorter than the type I have from Dr. Rex, and the elaters are remarkably branched."

65. *T. affinis* De Bary. Greenfield (Harvey), Sept., 1895.

66. *T. nana* Mass. Westbrook (?). According to Lister this is the same as *Hemiarcyria Wigandii* Rost., a form which we record under that genus from Orono.

67. *Oligonema nitens* Rost. Orono, Sept., 1889. Greenfield, 1893 (Harvey). Our specimens are finely developed.

68. *Hemiarcyria* (*Hemitrichia*) *rubiformis* (Pers.) Rost. Cumberland (Blake). Rangely (Rex). Orono (Harvey).

69. *H. clavata* (Pers.) Rost. Common on fallen trunks. Sept. to Nov. Rangely (Rev). Orono, Greenfield (Harvey).

70. *H. serpula* (Scop.) Rost. Bar Harbor (Rex).

71. *H. Wigandi* Rost. Orono, Oct., 1892 (Harvey). Rex says, "This has not been recorded from America before. It answers the description well, except that the spore and thread measurements are less." Lister refers *Trichia nana* Mass. which is reported from Westbrook, Me., to this species.

72. *H. leiocarpa* Rost. On vegetable debris. Portland (Bolles). Grev. 5: 150.

73. *H. stipata* Schw. Orono, Oct. '90, Oldtown, Sept. '95 (Harvey). Rex says of the specimens collected in 1890, "That I have specimens in abundance of this species from several localities in this country, but yours has the most strongly marked capillitium. It is valuable for that reason." Lister refers this to *Arcyria stipata* Lister.

74. *H. plumosa* Morgan. On fallen trunks. Sept. 1895, Oldtown (Harvey). Lister makes no mention of this.

Ord Arcyriaceae.

75. *Arcyria punicea* Pers. Bar Harbor and Rangely (Rex). Orono and Oldtown (Harvey).

76. *A. cinerea* (Bull.) Schum (*A. albida* Pers). Rangely (Rex). Orono and Jackman (Harvey).

77. *A. adnata*, Batsch=*A. incarnata* Pers. Cumberland (Blake). Rangely (Rex). Orono and Oldtown (Harvey).

78. *A. nutans* (Bull.) Grev. Orono, Greenfield, Jackman (Harvey).

79. *A. aurantiaca* Rounk. On decayed pine boards. Orono, Oct., 92 (Harvey). Our specimens were determined by Dr. Rex. Lister says the description clearly refers to *A. ferruginea.*

80. *A. OErstedtii* Rost. Rangely (Rex).

81. *A. minor* Schw. Greenfield, 1895 (Harvey). Lister does not mention this.

82. *A. ferruginea* Saut. In low ground. In large masses several inches square, upon the under side of a decorticated log. Orono, Oct., 1893 (Harvey).

Dr. Rex makes the following note on this species: "This is an exceedingly interesting specimen to me, partly because it is the first American specimen I have seen, and partly from its variable thread sculpture. It is typical only in the central part of the capillitium. Both the basal and apical portions differ from my European types. Still I think it should be referred as above. I have compared it with authentic specimens of *A macrocarpa* Pk. Externally the resemblance is very great, but the capillitium is different, yet suggests your species in a few places. It seems to be one end of a series, of which *A. ferruginea* forms the other, and your specimens the central position. I should call your specimen an intermediate form between the above species, but referable rather to *A. ferruginea.*"

83. *Perichaena chrysosperma* Lister. This is reported from Rangely by Rex, as *Cornuvia Wrightii* Rost.

84. *P. depressa* Libert. Rangely (Rex.).

Ord. Margaritaceae.

85. *Dianema Harveyi* Rex. Our specimens are the type of this genus. They were obtained on decorticated poplar in a swamp near Orono, Sept., 1889. They have not been detected since the original gathering, though searched for carefully. The species may be regarded as rare.

ORD. LYCOGALACEAE.

86. *Lycogala miniatum* Pers.=*L. epidendrum* List. Very common. Cumberland (Blake). Rangely (Rex.). Orono (Harvey).

On a new Species of Scrophularia hitherto confounded with S. Marylandica.

BY EUGENE P. BICKNELL.

Two totally distinct species of *Scrophularia* are included under the name *Scrophularia Marylandica*, the common Figwort of the Eastern States. The true *S. Marylandica* is a late-flowering plant, beginning to bloom in the neighborhood of New York from the second to the fourth week of July, and continuing to bear flowers into late September or even October. The other species blooms in the spring and early summer—from about the middle of May until late June or early July. Its latest flowers are gone long before the earliest of *S. Marylandica* appear.*

It is not a little remarkable that this very noteworthy difference in the flowering-periods of these common plants should have remained so long undetected, and the fact readily explains why only a single species has been recognized; for, so close is the resemblance between these two figworts that, were their flowering periods identical, their distinctness would scarcely have been suspected. The case affords a striking illustration of extremely close general resemblance between species fundamentally distinct.

That I am not wrong in thus characterizing these plants will, I think, sufficiently appear from a comparison of their roots alone which exhibit notable differences both in morphology and in anatomical structure. It is to be especially remarked, also, that each plant has a characteristic odor distinctly different from that of the other.

It is a matter of curious interest now to recall the long-existing differences of opinion as to whether our *S. Marylandica*,

* Observations made the present season show that this general rule is not without exceptions. On July 7th, among an abundant growth of the early-flowering species on a shaded northern slope, three belated flowers were found; the same day some plants of *S. Marylandica* which had strayed from the woods into damp open ground showed their first flowers.

actually embracing two species, was or was not different from the European *S. nodosa*. Of the latter plant I have seen only two incomplete specimens, enough, however, to satisfy me that it is perfectly distinct from both of its East American relatives.

I have not overlooked that Pursh ascribed two species of *Scrophularia* to the Eastern States. There cannot be any doubt, however, that his *S. lanceolata* was merely a form of *S. Marylandica*, as authorities have ruled. At first glance the brief description of the former might seem to point to our early-flowering species, but a more careful reading does not allow this view. Not only is no one of the essential characters of this plant defined, but the flowering period given by Pursh—"Aug.–Sep."—is alone conclusive against his *S. lanceolata* being the same as our species which flowers in May and June. Moreover, Pursh's description perfectly accommodates certain narrow-leaved forms of true *S. Marylandica*.

As bearing on this point it may be noted that in the Herbarium of Columbia University is a sheet of true *S. Marylandica*, labeled in Dr. Torrey's hand "*S. lanceolata*, Pursh," followed by the full reference to Pursh's publication. Another sheet of Dr. Torrey's labeled *S. Marylandica* exhibits specimens of both our species.

For the new plant I propose the name *Scrophularia leporella* * in reference to the flower which bears a curious resemblance to a little rabbit sitting upright with ears erect. In the very similar flowers of *S. Marylandica* the same resemblance is seen, but is less striking.

* Since this was written Mr. P. A. Rydberg has described a new *Scrophularia* from the Black Hills of South Dakota as *Scrophularia nodosa occidentalis*. (Cont. U. S. Nat. Herb. 3: 517.) Mr. Rydberg, who has seen specimens of my *S. leporella* declares that it is not the same as the Dakota plant, the types of which were large-flowered, and showed a peculiar basal cutting of the leaves something like that seen in *S. Californica*. Certain specimens of *Scrophularia* from Nebraska in the Columbia Herbarium, which Mr. Rydberg regards as referable to his *occidentalis* seem to show a close affinity to *leporella*, and are certainly nearer to it than to *Marylandica*. It is evident from this that the western plant should stand as *Scrophularia occidentalis*. It would be clearly illogical to maintain it as a variety of the European *nodosa*, and, if it should prove to be related varietally to one of our eastern species, that species would almost certainly be *S. leporella*, which would have to take the varietal designation.

SCROPHULARIA MARYLANDICA L.

Erect, mostly 5°–6° tall (3°–10°), large plants becoming widely candelabrate branched above, the branches sometimes reaching an expanse of 5°. Stem glabrous and shining, four-sided with rounded angles and deeply grooved or impressed sides, more or less acutely quadrangular above. Panicles terminal on stem and branches, often somewhat pyramidal, mostly about 1° long (6′–2°) and leafy at the base, glandulose above and in the cymes, the glandules purple, stalked or terminating minute hairs. Cymes racemose, numerous, rather close, widely spreading or ascending, varying from short and contracted to loose and open, 2′–5′ in length and breadth, the peduncles usually much shorter than the branches. Perfectly developed cymes are formed by the forking of the peduncle into two diverging, evenly zig-zag branches bearing at each angle a slender-pedicelled flower, a solitary longer-pedicelled flower rising from the angle of the fork. In many cases the structure is less regular, and more contracted cymes may be irregularly dichotomous. Cymes bracteolate throughout, the bracteoles subtending the pedicels mostly in opposite pairs, linear-subulate, spreading or recurved. Flowers few to many; on the lower cymes rarely less than 9–11 and frequently twice that number. Leaves slender-petioled, deep green, rather thin and veiny, glabrous above (with fine scattered hairs when young) minutely pubescent below (nearly glabrous to softly pubescent) often very large, reaching a length of 1° and a breadth of 6′, mostly ovate-lanceolate from a rounded or sub-cordate base, but varying greatly, from cordate-ovate and acute to lanceolate and acuminate with acute or narrowed base; uppermost leaves often narrowly lanceolate tapering to either end. The leaves vary also from regularly or irregularly serrate or dentate to coarsely doubly dentate-serrate or even sharply dentate lobed. Petioles long and slender, from ⅓ to ¾ the length of the blade, or longer in the lower leaves, becoming gradually shorter in the upper leaves, ciliate-pubescent along the upper side, sometimes glabrate; nodes of the stem between the petioles often ciliate-fringed. A fascicle of small leaves or a single pair, often quite rudimentary, occupies the axil of each cauline leaf; lowest leaves of the stem large and fully developed, on long petioles. Corolla ventricose-ovoid, puncticulate with pellucid glands, 3″–4″ long, 2″–2½″ wide, little contracted at the throat, the lobes short, the lateral pair and the upper lip usually slightly spreading, the lobes of the upper lip short and rounded; outside of tube green, appearing dull and finely cellular, the interior shining and with the upper lip mostly deep brownish purple; not infrequently the flower is nearly all greenish-yellow. Sterile stamen with its adnate filament deep purple, about ¾″ broad; style filiform, scarcely enlarged at base. Calyx-lobes orbicular to oblong, obtuse, scarcely margined. Flower-buds dull

green before expanding. Capsule 2″–3″ long, about 2″ wide, short-ovoid or subglobose, mostly abruptly contracted or rounded to a slender mucronate point, often becoming black. Rarely the capsule is 3, 4 or 5-celled.

Woodland in rich soil, usually about rocky places, sometimes at the borders of thickets in low grounds.

Begins to flower at New York about the middle of July (July 7–28). In some seasons flowers are still to be found at the end of September.

Specimens have been examined from various localities from New York and Ohio to North Carolina, Tennessee and Kansas.

SCROPHULARIA LEPORELLA n. sp.

Lower than *S. Marylandica*, mostly 3°–4° tall (2°–7°), erect, but sometimes inclined from the weight of the fruiting panicle, commonly simple or nearly so, or developing a few ascending slender branches, rarely strongly branched. Stem throughout quadrangular with flat sides and acute margined angles, more or less glandular-puberulent especially when young, becoming glabrate below, viscid-glandular above and throughout the panicle; glandulosity finer and closer than in *Marylandica*, the smaller glandules pale. Panicle commonly longer and narrower than in *Marylandica*, 1°–3° in length, naked or with small leaves subtending the lowest cymes. Cymes commonly fewer-flowered and more contracted than in *Marylandica*, the branches and pedicels less slender and spreading, mostly under 2′ long and broad (1′–3′, rarely longer), ascending, frequently much separated, the branches often not longer than the peduncles, the bracteoles mostly not in pairs or finally recurved as in *Marylandica*, but solitary and somewhat appresed or incurved. Flowers of the cymes mostly 5–7, rarely more than 11, sometimes only 3 in each cyme throughout. Exceptionally, on strongly developed plants, the cyme may be as long-branched and many-flowered as in *Marylandica*, presenting, however, a very distinct appearance from the more ascending branches and pedicels and longer more attenuate capsules. Leaves commonly smaller than in *Marylandica* (largest 10′ x 4′) thicker and less rugose, brighter green, glabrous both sides, somewhat shining below (when young with some minute glandular hairs on the veins above and below) varying from deltoid-ovate through ovate and oblong to lanceolate and narrowly lanceolate, truncate, cordate, rounded or tapering at the base, from finely and evenly to coarsely and irregularly dentate-serrate or sharply cut dentate, sometimes with acuminate and elongated spreading uncinate teeth. Petioles short, from ⅛ to ⅓ the length of the blade, stouter than in *Marylandica*, finely glandular-puberulent, on the upper side short-ciliate. Leaves of the axillary fascicles larger than in *Mary-*

landica, the fascicles sometimes developing into short sterile branches. Lower leaves of the stem reduced or rudimentary, early deciduous, the lowest reduced to appressed scaly bracts. Corolla longer and narrower than in *Marylandica*, more delicately veined but not glandular-puncticulate, more contracted at the throat 4″–5″ long, 2″ broad, the lobes longer than in *Marylandica*, especially the upper one, the two lateral lobes erect or slightly incurved, the lobes of the upper lip often narrowly oblong. Surface of the corolla-tube shining, greenish and purplish, the interior green and dull, the lobes varying from yellowish-green to dull purplish-red, or sometimes a bright pink-red; sterile stamen greenish-yellow, its lobe slightly more adherent than in *Marylandica* and mostly more abruptly dilated to the broadly truncate top which is ½″–1″ wide. Calyx-lobes broadly or narrowly ovate, obtuse or acute, slightly margined. Flower-buds shining, bright green with a purple spot at the top. Capsules ovoid-conic to elongated-conic or attenuate, passing into the thickened base of the style, 2″–5″ long, 1½″–3½″ wide, at maturity slightly compressed and impressed along the sutures, mostly brown, the surface often distinctly reticulate-veined. Seeds a little larger than those of *Marylandica* and darker, otherwise similar—irregularly oblong, often curved, strongly wrinkled striate and pitted. Roots fewer and simpler than in *Marylandica*, much stouter and longer, coalescing basally to form a large irregular woody structure which may be as much as six inches in longer diameter.

Wooded hillsides in rich soil, straying into open ground along roadsides where it sometimes becomes much branched and unusually stoutly developed.

Common near New York City. Dr. Britton finds it common on Staten Island. I have met with it within eight miles of the Connecticut line and in the Pocono region of eastern Pennsylvania. Its further distribution remains to be ascertained.

Begins to flower at New York from before the middle of May to the end of the month. Full sized fruit is already formed early in June, and by the end of the month only a few belated flowers, if any, remain.

Although this species occurs in much the same kind of situations as *S. Marylandica*, the two are rarely found growing together, or even inhabiting the same piece of woods. Near New York are various tracts of woodland inhabited exclusively by one or the other species; twice only have I found them growing together, apparently in accidental association in both cases.

Allusion has been made to differences in the root-structure

of these two figworts. These differences are so distinctly marked, even to the unaided eye, that identification may safely rest on a mere glance at a fragment of the fresh root. In *Marylandica* the central cylinder is slender, occupying only about one-third of the diameter of the root; it is hence of about the thickness of the surrounding cortex, from which it is sharply distinguished by its greater whiteness, especially at its tough and lignified outer walls. Upon attempting to break the root the cortex is easily ruptured and peels off smoothly from the central cylinder which bends readily but refuses to break. In *leporella* the central cylinder is of softer texture and much larger, occupying the greater part of the interior of the root; its walls are not lignified, nor is it sharply marked off in color from the surrounding thin layer of cortex, which is not readily disengaged from it. The root is easily snapped in two, showing an even plane of fracture.

A comparison of the flowers of these plants shows a curious reversal of color characters between them. In *Marylandica* the surface of the corolla tube is green and dull, the interior shining and brownish-purple; in *leporella* the outside of the tube is purplish and shining, the interior green and dull. The color of the sterile stamen, deep purple in *Marylandica*, yellowish-green in *leporella* is absolutely constant, that is to say, a reference to hundreds of flowers of each species has discovered no exception. Even in flowers of *Marylandica* which are pale green nearly throughout, the sterile stamen remains purple; conversely, in the most highly colored flowers of *leporella* the green stamen is without the slightest purple tinge.

The early annual shoots of these plants show some interesting comparative differences. Before the end of April the stouter shoots of *leporella* are already a foot or more high, four or five times as tall as those of *Marylandica*. In the former the base of the shoot is leafless, often for several inches, and invested with broad, appressed, overlapping scales or bracts (modified petioles); these show a gradual transition into the small lower leaves. The early leaves have broad, flat petioles, sometimes nearly half an inch wide; the bases of the blades are mostly entire and sharply truncate. In *Marylandica* the lowest pair of leaves are large and fully developed, on long slender petioles which rise from nearly the extreme base of the shoot.

Reviews.

Plants of Monroe County, New York, and adjacent Territory.— Many catalogues of American local floras have been published. Among the regions most thoroughly explored is that of central and western New York. The number and character of the students who, first and last, have done field work within its limits would warrant this conclusion without taking into consideration their published results. Gray, Torrey, Vasey, Knieskern, Clinton, Sartwell, Paine, Wright, Day, Dudley and others have published papers, while many others have assisted in collecting information.

The recent publication, by the Rochester Academy of Science, of a catalogue of "Plants of Monroe County, New York, and Adjacent Territory,"* adds a large amount to our knowledge of the plants of this region. The catalogue is something more than a list, as may be seen by the table of contents.

Inception of the Work; Authorship.
Scope of the List.
Territory included.
    The Map.
Authorities and Collectors.
    Early Botanists of the Region.
    Recent Collectors.
    Acknowledgments.
Localities of Special Interest; The Lessér Floras.
    Shore of Lake Ontario.
    Irondequoit Bay.
    Genesee River.
    Mendon Ponds.
    Swamp at Adams Basin.
    Bergen Swamp.
    Ravine at Holly.
Introduction of Species.
Disappearance of Species.
Forest Trees.
Statistics of the Flora.
    Systematic Distribution.
    Leading Orders.
    Leading Genera.
    Comparative Statistics.

* Plants of Monroe County, New York, and Adjacent Territory. Published by the Rochester Academy of Science: 150 pages; large octavo, with two maps. Price, one dollar.

Affinities of the Monroe Flora.
General Comparison.
Comparison with the Cayuga Flora.
Plants common to the Monroe and Cayuga Floras.
Comparison with the Buffalo Flora.
Plants common to the Monroe and Buffalo Floras.
Comparison of Cayuga and Buffalo Floras.
Plants common to the Cayuga and Buffalo Floras.
List of Plants peculiar to each of the three Floras.
Plants peculiar to the Monroe Flora.
Plants peculiar to the Cayuga Flora.
Plants peculiar to the Buffalo Flora.
Physical Characters of the Region, by H. L. Fairchild.
Geography and Hydrography.
Topography and Altitudes.
List of Elevations.
Geology.
Stratigraphy.
Pleistocene Drift.
Influence upon Plant-life.
Climatic Conditions.
Statistics of Climate at Rochester.
Date of earliest blossoming of Trees.
The Catalogue.
Explanation of Plan.
Authorities.
Topography and Reference Marks
List of Phanerogams.
List of Vascular Acrogens.
Bibliography
Corrections and Insertions.
Index to Orders and Genera.

The work is made up of two main parts, the introduction and the catalogue proper. The plan of the whole work is similar to Professor Dudley's Cayuga Flora. There is lacking in it the evidence of painstaking research by the authors, so evident in every page of Professor Dudley's book. "The committee have collated all the lists of plants of this vicinity which they have been able to obtain, have examined the specimens in the herbarium of the Academy, and have used all available sources of information."

The list includes phanerogams and vascular acrogens. The unstable condition of botanical nomenclature apparently subjected the committee to some embarrassment. They used the old nomenclature in order to make the work "immediately useful to the

schools of western New York," Gray's Manual being the standard text-book. By including the names of the new system in brackets wherever they differ from the old, it is hoped to make the publication up to date in botanical science, and at the same time available to the students in the high schools.

The tables in the introduction are interesting and suggestive. The number of species of flowering plants in the region is 1314, and consequently exceeds the number included in Professor Dudley's Catalogue as well as Mr. Day's "Plants of Buffalo." Some feeling is shown over the fact that Mr. Day reached far enough east to include the plants of Bergen Swamp. In the tables of comparison the Bergen plants are eliminated from the Buffalo list. An outsider might think this unjustifiable manipulation of the returns. It should be remembered, however, that Rochester and Buffalo are rival cities, and are not always on the most neighborly terms. The situation would be less amusing had not Rochester done very nearly the same thing herself for which she rebukes Buffalo. In including the plants of Wayne County and the region about Canandaigua Lake, about thirty-six plants were added to the list which have not been seen in Monroe County nor in the valley of the Genesee River.

However inconsistent it may be for Rochester to expunge from the Buffalo list its eastern extension, and at the same time to include an eastern extension of its own, every botanist will rejoice that the observations of Mr. Hankenson in Wayne County have been recorded. Monroe County is not a natural district, and the main issue is to include all the facts regarding the distribution of plants in that general region.

The committee gives its authority for each rare plant and thereby relieves itself, in part at least, of the responsibility for errors. It includes the lists of isolated amateur collectors without seeing their specimens or rediscovering their stations. Twelve or thirteen rare plants are included in the catalogue on the authority of the list of Rev. Lawrence Holzer, who collected about Rochester between 1862 and 1865. One plant, *Carex squarrosa*, the committee declines to give a number. Those included are *Nicotiana rustica* L., *Thymus Serpyllum* L., *Alnus serrulata* Willd., *Quercus ilicifolia* Wang., *Salix fragilis* L., *Allium vineale* L., *Trillium sessile*

L., *Carex monile* Tuckerm., *Muhlenbergia sobolifera* Trin., *Glyceria pallida* Trin., *Bromus racemosus* L., *Abies balsamea* Mill. Among these the species which arouses the greatest suspicion about Holzer's observations is the *Quercus*. Sargent avers (Silva of North America, 8: 156) that *Q. ilicifolia* " apparently does not reach central New York, nor cross the Alleghany mountains into the Mississippi basin." Other plants in Holzer's list belong to groups such that one who did not have access to verified specimens, might easily go astray in. In making up the lists peculiar to each of the three floras—Monroe Co., Buffalo and Cayuga—the committee spared no pains to swell the Monroe Co. list. A considerable percentage of them are plants of recent introduction, some of them are given no number in the list. But it would be unfair, perhaps uncharitable, to dwell upon the parts of the work in which the committee has emphasized the richness of their flora.

The historical sketches are welcome contributions to our too meager knowledge of local botanists. The maps are excellent; the sketches of localities are full of interesting matter. The remarks upon forest trees, which always form such a conspicuous feature in a flora, make one wish that more information had been collected and included. It is certain that Mr. Fuller could have put upon record much that those local botanists who succeed him would be glad to possess. W. W. ROWLEE.

The Roentgen Rays and Botany.—It is reasonable to suppose that botanists, among other scientists, should devote some attention to the influence of Roentgen rays upon vegetable life. So far only minor reports have been published owing to the fact that sufficient time has not yet elapsed for the attainment of reliable results.

Schober* has published the preliminary results of his observations on the influence of the Roentgen rays upon the heliotropic curvatures of plants. He experimented upon the seedlings of *Avena sativa*. The seed was allowed to germinate in a dark chamber after which it was exposed (without being removed from the dark chamber) to the Roentgen rays for a period of one-half

* Schober, Alfred. Ein Versuch mit Röntgen'schen Strahlen auf Keimpflanzen. Ber. deutsch. bot. Ges. 14: 108–110. 1896.

hour. Upon examination it was found that the new rays had not induced any curvatures. A further exposure of one-half hour induced no curvatures. Afterwards the seedlings were exposed to one-sided diffuse sunlight, to determine whether any after effects would be manifest. It was found that the heliotropic curvatures took place promptly and proceeded normally. From these experiments the author concludes that the new rays differ from sun rays in that they do not cause growth curvatures. No observations were made as to whether the seedlings absorbed the Roentgen rays.

Recently Hintenberger* has published some interesting results in regard to the preparation of Roentgenograms of vegetable tissue. From some previous experiments made by K. Zahlbruckner and W. König it became apparent that certain tissues are very clearly outlined, especially the interior of the ovary. The author, with the assistance of Dr. A. Zahlbruckner, made a series of experiments testing the transmissibility of different flowers, buds and fruits to the Roentgen rays. From the Roentgenograms obtained it was found that not all ovaries gave the same clearness of outline. Seeds having a comparatively low percentage of water and a large number of air chambers and passages gave the best results, as for example beans and peas. Fleshy fruits transmit the new rays with difficulty. The interrupted water columns in the vessels of the stem of a species of *Nuphar* were outlined.

Further Roentgenogramic experiments with dried herbarium specimens, of seedlings, woody tissues, etc., are in progress. The author ventures the suggestion that vegetable tissue may perhaps be made more readily transmissible to the new rays by impregnation with various solutions, such as solutions of lead salts, etc. It is also his opinion that the sensitive plates can be made to respond more effectually to the influence of the Roentgen rays.

A. S.

*Hintenberger, Hugo von, "Röntgenogramme" von Planzentheile. Separatabdruck aus der Photographischen Correspondenz. 1896.

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CONTENTS:

	PAGE.		PAGE.
Botanical Gardens: *N. L. Britton*	331	The Stigmas and Pollen of *Arisaema:* W. W. Rowlee (PLATES 272, 273)	369
Proceedings of the second Annual Meeting of the Botanical Society of America	345	REVIEWS.—An Illustrated Flora of the Northern United States, Canada and the British Possessions, from Newfoundland to the Southern Boundary of Virginia and from the Atlantic Ocean, westward to the 102nd meridian	371
Titles of Papers read before the Section of Botany, A. A. A. S., Buffalo Meeting, August, 1896	347	INDEX TO RECENT LITERATURE RELATING TO AMERICAN BOTANY	378
Proceedings of the Botanical Club, A.A.A.S., Buffalo Meeting, August, 1896	350		
New and noteworthy Species of *Saxifraga:* *John K. Small*	362		

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